



# Unmanned Aircraft Systems

## Bridging the Observations Gap Between Earth and Space

Unmanned Aircraft Systems (UAS) can revolutionize NOAA's ability to monitor and understand the global environment. There is a key information gap today between the instruments on Earth's surface and those on satellites—UAS can bridge that gap. Operated by remote pilots and ranging in wingspan from less than six feet to more than 115 feet, UAS can collect data in dangerous or remote areas. Better data and observations improve scientific understanding of the environment and forecasts, and save lives, property, and resources while advancing NOAA's mission goals. NOAA is partnering with other federal and state agencies, academia, and private companies to test and evaluate a variety of UAS that could be part of a future NOAA fleet.

**Top:** The Global Hawk UAS deploys a NOAA dropsonde as part of the NASA HS3-Hurricane and Severe Storm Sentinel Mission. **Bottom:** A dropsonde being released from one of NASA's Global Hawk aircraft. Both photos courtesy of NASA.

**UAS can help** NOAA meet its mission goals by collecting data from areas that are currently inaccessible (such as in remote regions of the Arctic.) Specifically, UAS may:

- Extend hurricane landfall lead times by observing storm environments
- Improve the accuracy of storm forecasts, benefitting emergency managers and diverse private industries
- Improve understanding of climate change
- Assess changes in Arctic ice change and effects on ecosystems and coasts
- Improve flood and drought forecasts
- Increase safety and success in fighting wildfires that threaten people and property
- Monitor oceans, coasts, marine sanctuaries, and other environments important for fish populations

**Operated remotely and ranging in wingspan from less than six feet to more than 115 feet, UAS can collect data in dangerous or remote areas, such as the poles, oceans, wildlands, volcanic islands, and wildfires.**

## NOAA's UAS Mission Goals

The program goals of our mission areas—high impact weather, polar, and marine monitoring are to:

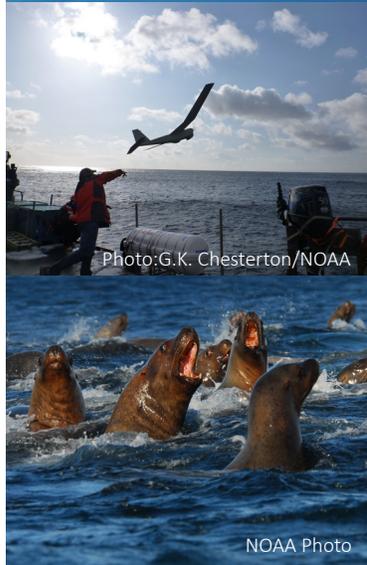
- Increase UAS observing capacity
- Develop high science-return UAS missions
- Transition cost-effective, operationally feasible UAS solutions into routine operations



NOAA Photo

<http://uas.noaa.gov>

# UAS: An Unprecedented Tool for Understanding Earth's Complex System



- 1: Puma being launched
- 2: NOAA Scientists use unmanned planes to test a quieter and possibly safer approach to survey populations of endangered marine mammals.
- 3: Unmanned Aircraft Systems Program is collaborating with partners to test and evaluate oil spill detection.
- 4: NOAA's USV Emily can be used in hurricane, marine operations, and fisheries research. Photo: NOAA

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## Recent Accomplishments

- Deployed the PUMA UAS to several National Marine Sanctuaries for shipboard- and land-based marine monitoring, and surveying marine mammals and marine-debris
- Developed the Global Hawk dropsonde system with the National Science Foundation
- Deployed small UAS for River Forecast Center operations surveys
- Deployed three UAS for marginal ice zone experiments in partnership with NASA
- Deployed PUMA UAS from US Coast Guard (USCG) icebreaker Healy for marine monitoring and oil spill detection in partnership with the USCG and University of Alaska
- Conducted UAS operations at Finch Point, Seguam Island, Alaska to test a quieter and safer approach to surveying populations of endangered marine mammals
- Conducted an Unmanned Surface Vehicle (USV) market analysis, acquisition atmospheric sensor integration, and initial testing for the Emily USV Hurricane Research

## Next

- Conduct a project focused on "Sensing Hazards with Operational Unmanned Technology (SHOUT)" to quantify the influence of UAS environmental data to high-impact weather prediction. SHOUT will assess the operational effectiveness of UAS and help mitigate the risk of observing gaps in satellites. Partnering with NASA, the NOAA UAS Program will conduct missions using advanced UAS including the Global Hawk to collect prototype data.
- Provide operational, technical, and science support for the Hurricane Severe Storm Sentinel (HS3) project to study tropical cyclones using two Global Hawks launched from Wallops Flight Facility during the summer of 2014
- Conduct a multi-platform maritime survey of the Northwest Hawaii National Marine Sanctuary
- Transition the PUMA UAS towards full operational capacity across NOAA
- Conduct marine, atmospheric, and geophysical research in support of several interagency efforts using UAS in polar regions
- Conduct STEM outreach; for the fourth year in a row, NOAA will participate in AUUSI's Annual Student UAS Competition at Naval Air Station Patuxent River's Webster Field

## Partnerships

NOAA's UAS work draws on expertise from industry, academic, and government partners. This broad coalition seeks to apply technologies used in national defense – including high- and low-altitude UAS, communication technologies, and instruments – to benefit the global environment.

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